Background Information

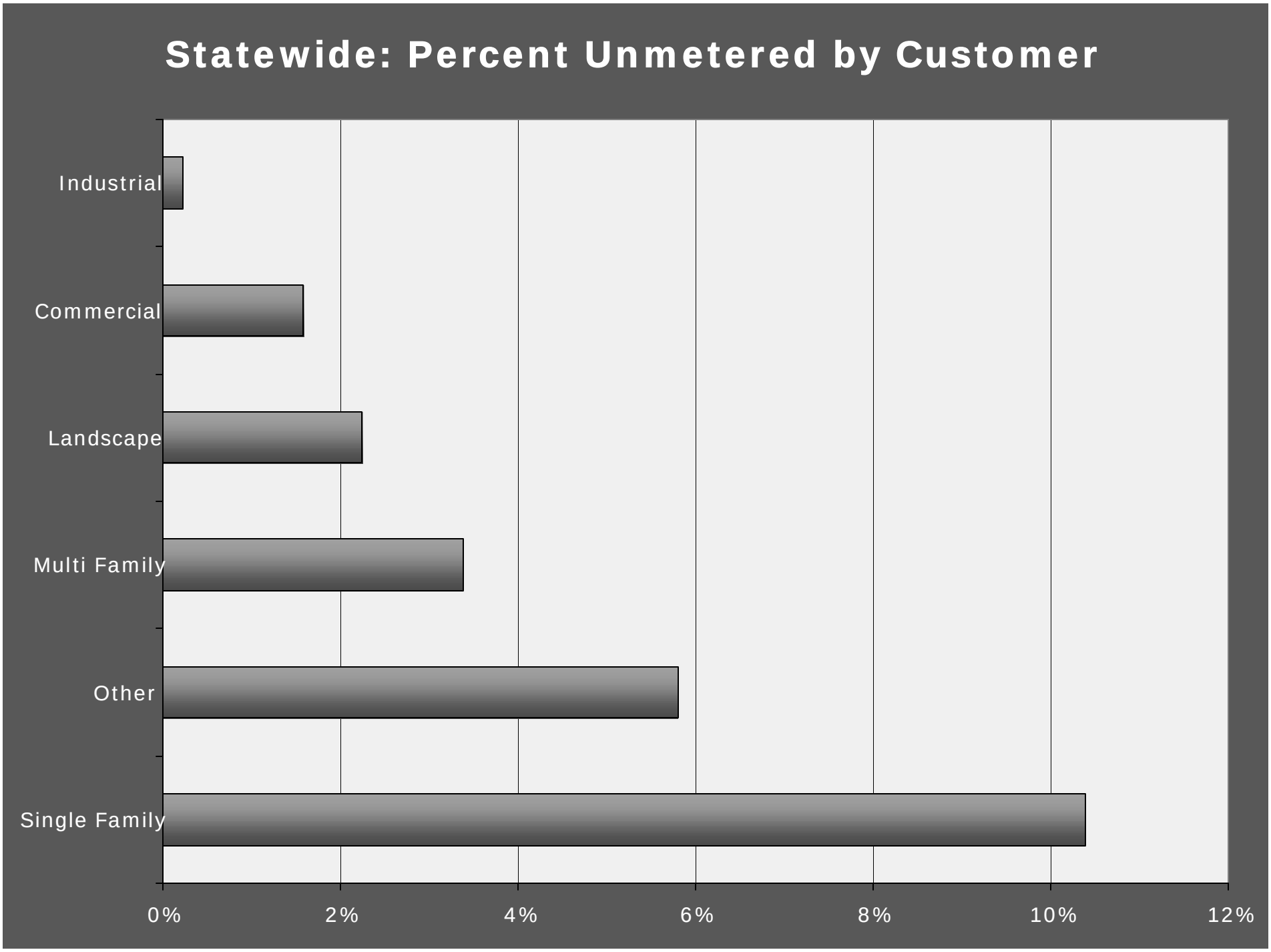
Appropriate Urban Measurement Workgroup Meeting

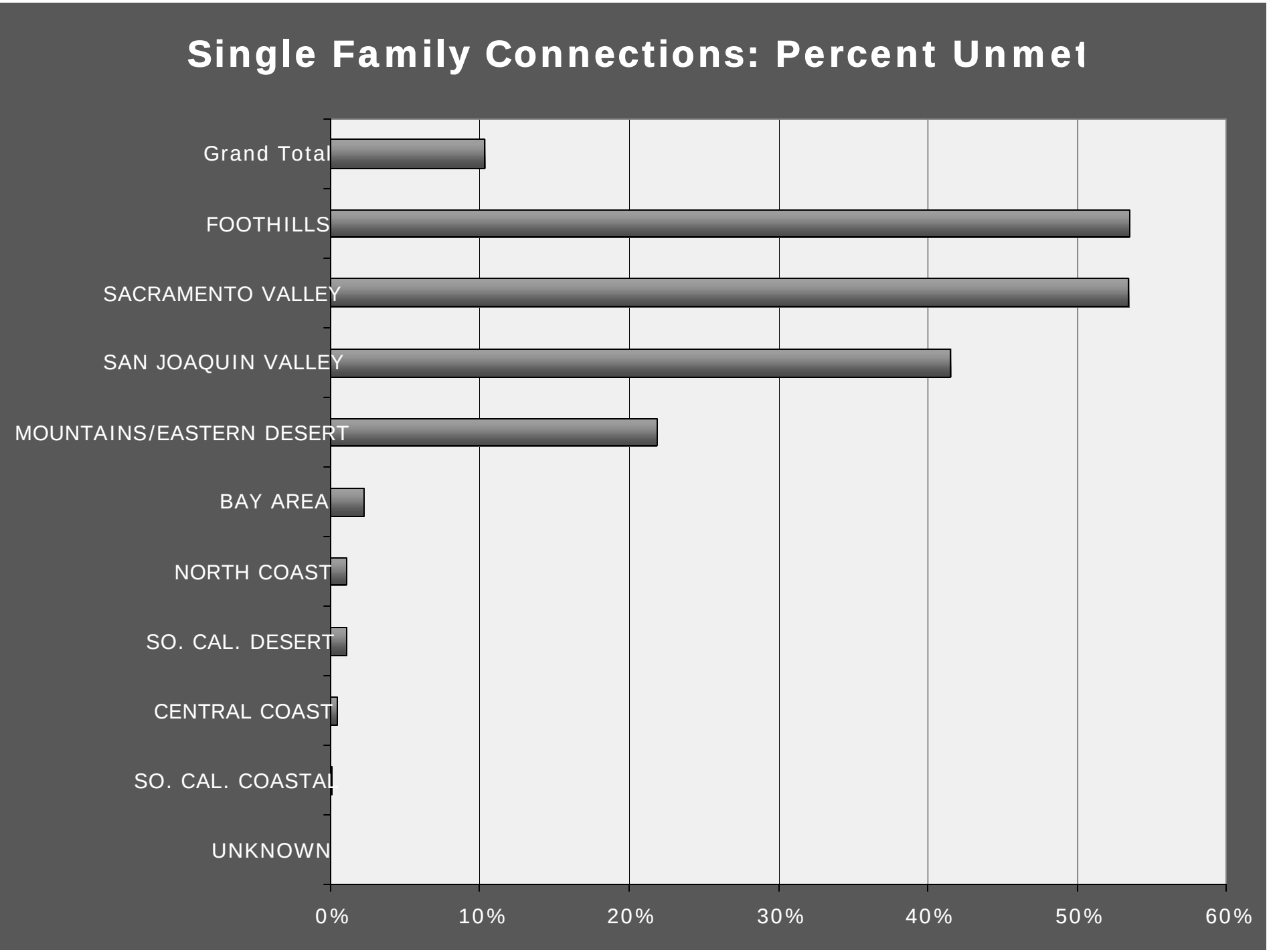
March 18, 2003

Urban Measurement Topics

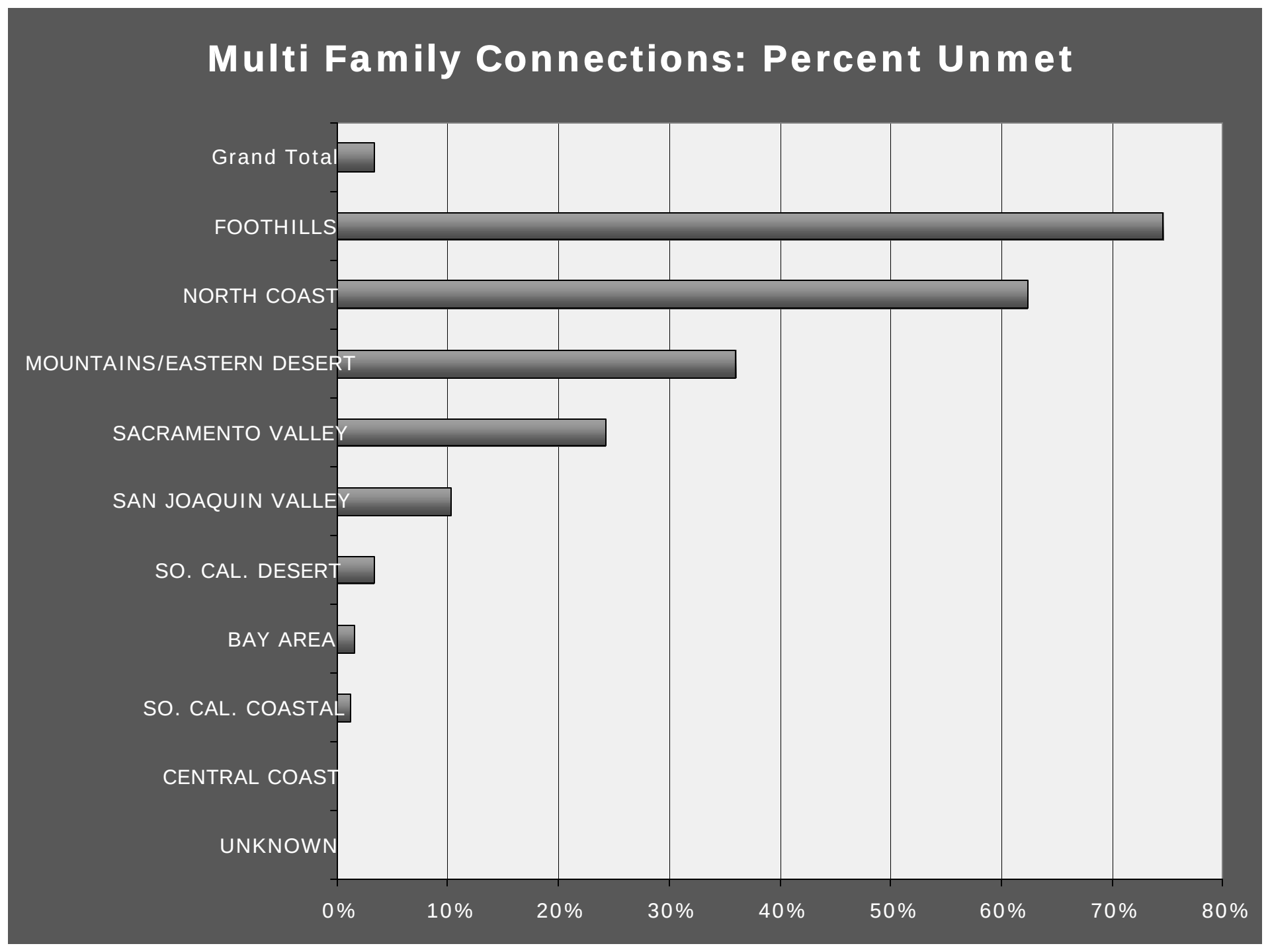
- Urban Measurement in CA
- Water Savings Estimates for Metering
- Cost of Metering
- Metering & BMP Implementation
- Submetering Water Savings & Costs
- Recent Metering Benefit-Cost Estimates
- Regional/Statewide Cost to Meter Single Family Connections ($/AF)

Statewide: Percent Unmetered by Customer

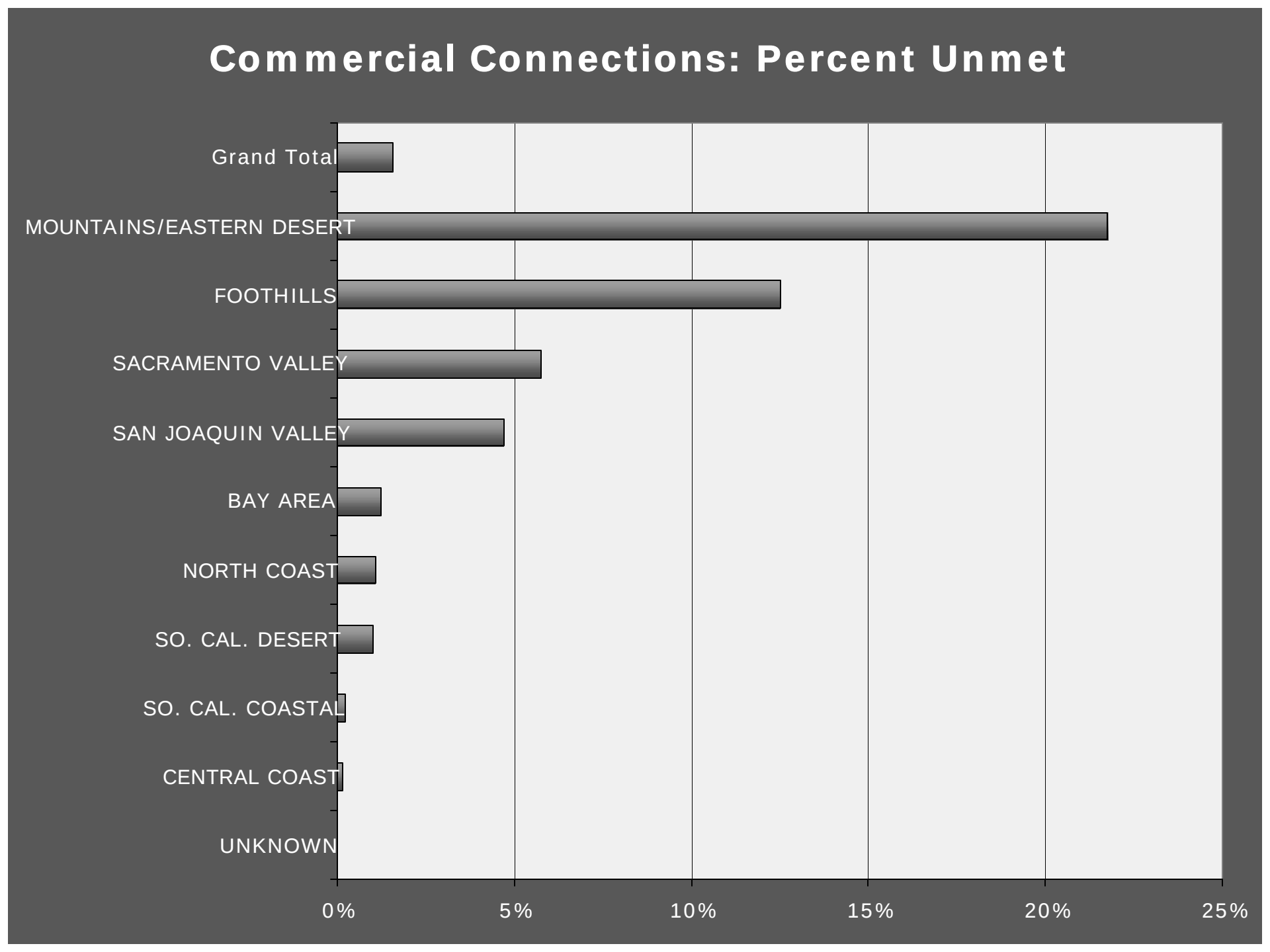



Single Family Connections: Percent Unmet
Grand Total
FOOTHILLS
SACRAMENTO VALLEY
SAN JOAQUIN VALLEY
MOUNTAINS/EASTERN DESERT
BAY AREA
NORTH COAST
SO. CAL. DESERT
CENTRAL COAST
SO. CAL. COASTAL
UNKNOWN
0%
10%
20%
30%
40%
50%
60%

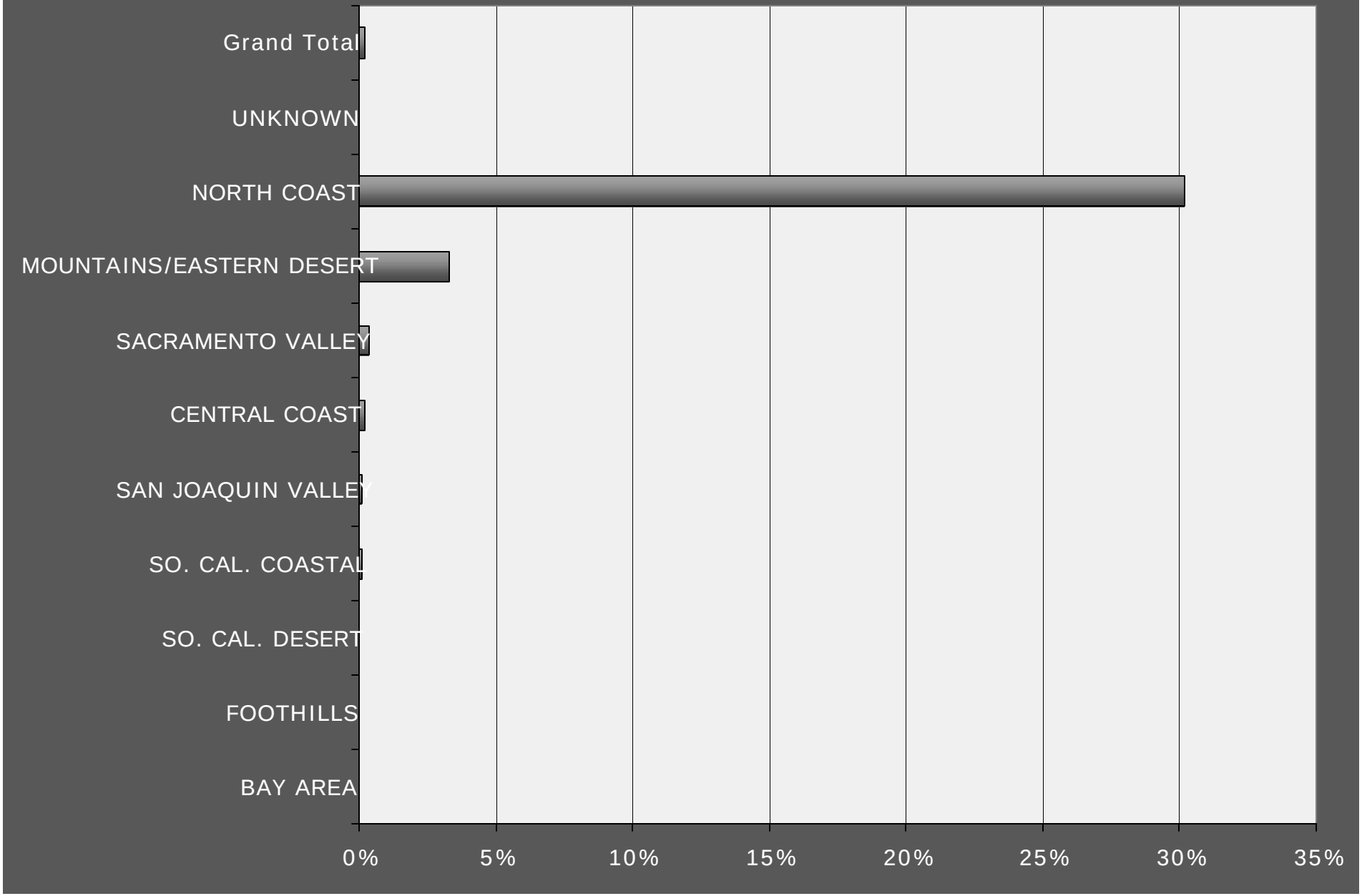
Multi Family Connections: Percent Unmet



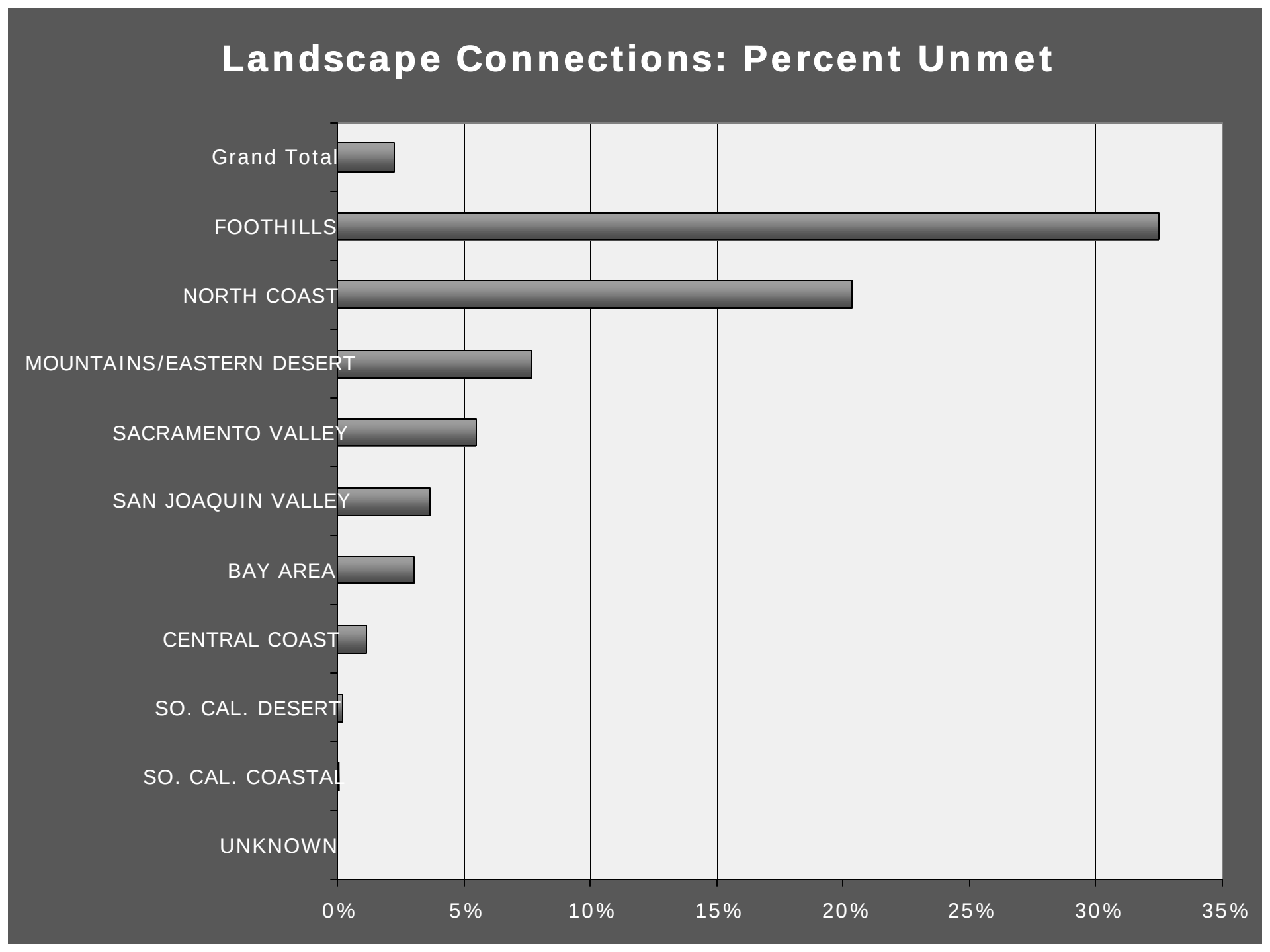
Commercial Connections: Percent Unmet

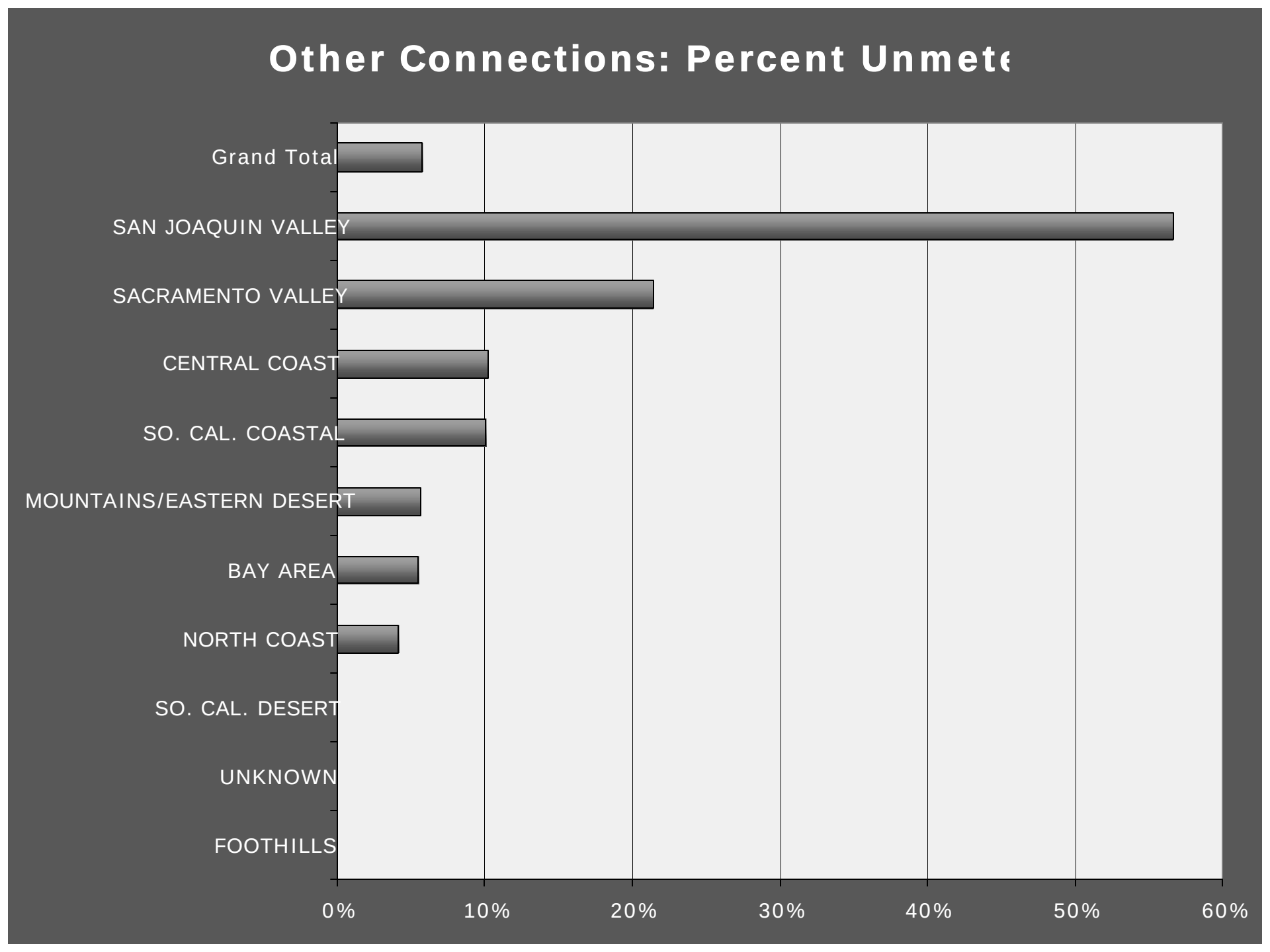


Industrial Connections: Percent Unmet



Landscape Connections: Percent Unmet




Other Connections: Percent Unmet
Grand Total
SAN JOAQUIN VALLEY
SACRAMENTO VALLEY
CENTRAL COAST
SO. CAL. COASTAL
MOUNTAINS/EASTERN DESERT
BAY AREA
NORTH COAST
SO. CAL. DESERT
UNKNOWN
FOOTHILLS
0%
10%
20%
30%
40%
50%
60%

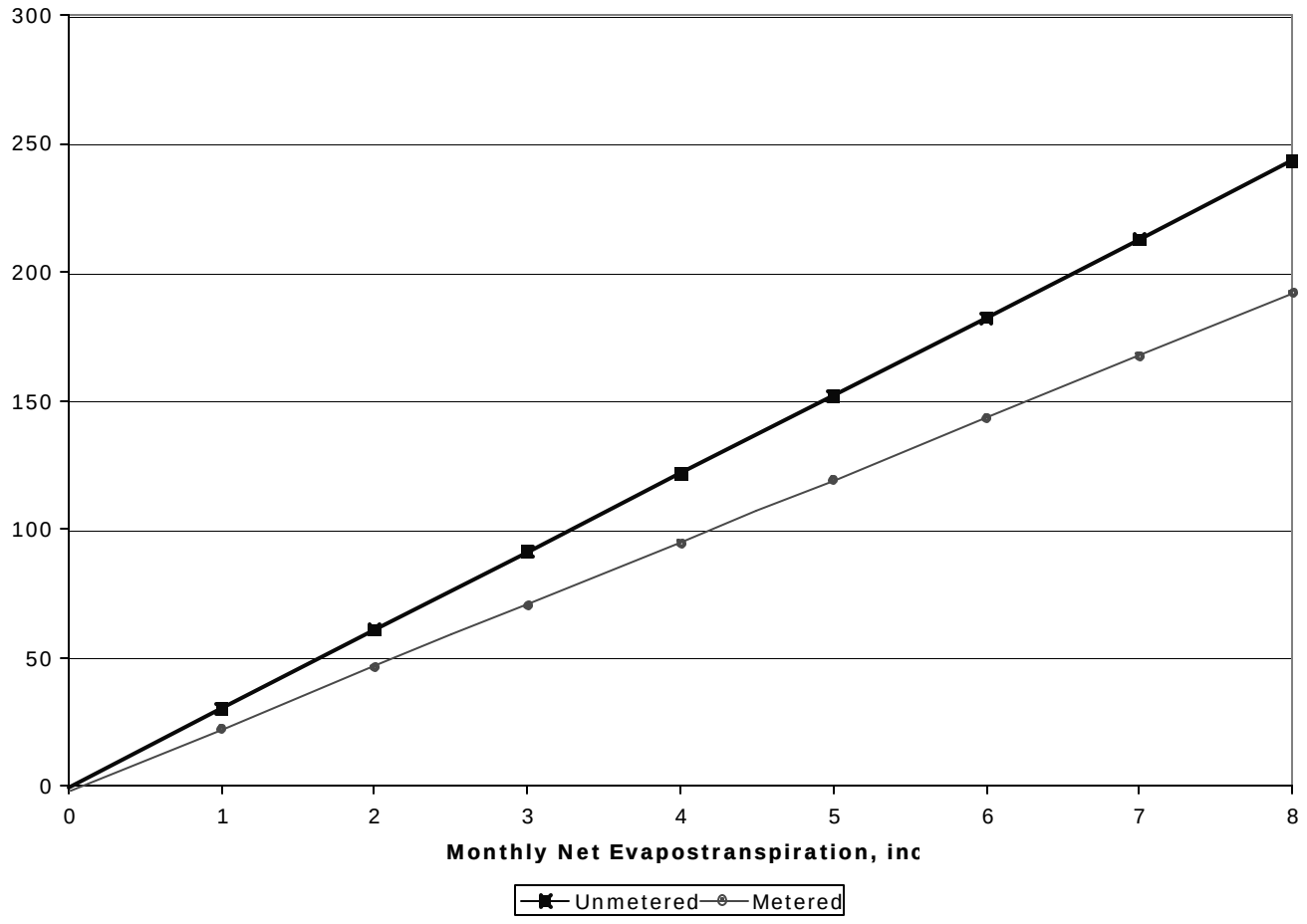
Meter Water Savings (1)

- Lund (1986) makes the following observation about metered M&I water use.
  - Decreases in use seem less related to the level of the new marginal price of water than to the new marginal price of water being non-zero. This implies that much of the conservation experienced accrues from either low-value uses of water (e.g. deferring leak repair and extensive lawn irrigation) or psychological factors arising from a new causal relation between water use and billing.

Meter Water Savings (2)

- Brown & Caldwell (1984)
  - The principal effect of metering is to reduce the amount of water used for landscape irrigation. This result was also found in the Johns Hopkins (1966) and Beck (1968) studies.
  - Brown & Caldwell (1984) estimated average reduction of 20% compared to unmetered demand.
  - Metering can benefit capacity constrained systems by reducing peak demand. The marginal value of this reduction can be high if system needs to add capacity.

Meter Water Savings (3)



Cost to Meter Existing Connections

- Single Family Central Valley: $500 - $1000 per meter

- Multi-family/Commercial: $500 - $3000 per meter depending on connection size.

Metering & BMPs

- Metering relevant to BMPs in two ways:
  - Implementation of BMPs 3, 4, and 11 requires metering.
  - Evaluation of water savings from BMP implementation dependent on records of metered water use. Absent metering, not possible to evaluate changes in water demand.

Submetering (1)

- Master metered connections can be submetered to measure individual demands on the customer side of the master meter
- Submetering master metered multi-family and commercial properties is a growing practice.

Submetering (2)

- Cost of submetering:
  - $125 - $250 per meter for new construction
  - $225 - $500 per meter for retrofits
  - Annual O&M of $24 - $36 per meter
  - Useful life of 10 years
- Water savings:
  - Few reliable estimates currently available
  - 10 - 20 % of unmetered indoor use typically quoted

Submetering (3)

- Unit cost of saved water based on Water Resources Engineering (2002) Cost & Savings Estimates

Submetering Multi-Family	Low	Mid	High
Unit Cost ($/gallon)	$0.01	$0.02	$0.04
Unit Cost ($/SF)	$3,705	$7,175	$14,113

Recent B/C Results for Metering Proposals

- 12 metering projects submitted to CALFED through 2001/2002 Grant Programs
- 7 for Central Valley; 2 for North/Central Coast; 2 for Bay Area; 1 for So. Cal.
- 7 shown to be locally cost-effective
- 2 shown to be NOT locally cost-effective (located in Sacramento region)
- 3 indeterminate because of data

Regional/Statewide Costs
Single Family Retrofits

Avg. Cost to Retrofit	$500
Avg. Life (yrs)	15
Discount Rate	6%
Avg. Savings (%)	20%

REGION	SF Unmetered	Capital Cost	Annualize Cos	Avg Residenti Use Pe Unmetere Acct (GPI	Annual Wat Savings (AF	Cost Per A
SAN JOAQUIN VALLEY	304,284	$152,142,000	$15,664,961	806	54,958	$ 285
SACRAMENTO VALLEY	125,475	$62,737,500	$6,459,626	791	22,220	$ 291
FOOTHILLS	39,392	$19,696,000	$2,027,955	Use Sac. V	6,976	$ 291
BAY AREA	13,866	$6,933,000	$713,841	No Estimate	No Estimate	No Estimate
SO. CAL. DESERT	6,213	$3,106,500	$319,854	821	1,143	$ 280
MOUNTAINS/EASTERN DESERT	4,973	$2,486,500	$256,017	No Estimate	No Estimate	No Estimate
SO. CAL. COASTAL	2,900	$1,450,000	$149,296	No Estimate	No Estimate	No Estimate
CENTRAL COAST	1,262	$631,000	$64,970	339	96	$ 679
NORTH COAST	542	$271,000	$27,903	No Estimate	No Estimate	No Estimate
STATEWIDE	498,907	$249,453,500	$25,684,422			